

1. What is RoHS?

RoHS is European Union Directive 2002/95/EC on the Restriction of Certain Hazardous Substances in Electrical and Electronic Equipment. It is pronounced "ross".

2. What hazardous substances are covered by RoHS?

RoHS restricts the use of lead (Pb), cadmium (Cd), mercury (Hg), hexavalent chromium (Cr6+), polybrominated biphenyls (PBBs) and polybrominated diphenyl ethers (PBDEs). Those restrictions are *in addition* to existing regulations, such as the 47 categories of dangerous substances restricted for use in nearly every product by EU Directive 76/769/EEC and its numerous amendments.

3. What products are covered by RoHS?

The scope of RoHS is given in the EU WEEE Directive Annex IA, categories 1 -7 and 10. The following is a summary of covered product categories:

1. Large household appliances
2. Small household appliances
3. IT and telecommunications equipment
4. Consumer equipment
5. Lighting equipment
6. Electrical and electronic tools (except large-scale stationary and industrial tools)
7. Toys, leisure and sports equipment
10. Automatic dispensers

Categories 8 and 9, which cover medical devices and measuring and control instruments, are exempt from RoHS requirements until which time the EU Commission includes them. A Commission meeting in February 2005 yielded early 2008 as a goal for including the exempt categories.

Electrical and Electronic Equipment (EEE) is defined as devices which are dependent on electric current or electromagnetic fields to work properly, including that equipment used to generate, transfer, or measure such currents or fields. The definition of EEE for RoHS is limited to those devices operating on a maximum 1000 Volts AC or 1500 Volts DC.

4. When do my products have to be compliant with RoHS?

The RoHS Directive goes into effect on July 1, 2006. If you are selling products on the EU market, your products must be RoHS compliant by that date. Note, that LINAK as a supplier of components to end-products, work hard on being compliant earlier than July 1, 2006. A precise date, however, can't be stated due to the fact, that some of our suppliers still haven't changed their basic material.

5. What are Maximum Concentration Values (MCVs)?

Maximum Concentration Values (MCVs) are limits set by the European Commission for each RoHS-restricted substance. The limits apply to each "homogeneous material" making up a product. Note that EU officials have stated that RoHS is considered to be a ban on the listed substances, and that any intentional use of those substances is not allowed.

The MCVs are as follows:

- 0.1% by weight maximum for Pb, Hg, Cr6+, PBBs, and PBDEs
- 0.01% by weight maximum for Cd

6. What is a "homogeneous material"?

The term "homogeneous" is understood as "of uniform composition throughout". Examples of "homogeneous materials" are individual types of: plastics, ceramics, glass, metals, alloys, paper, board, resins, and coatings. The Commission further states that a "homogeneous material" cannot be mechanically disjointed into different materials.

7. What does "mechanically disjointed" mean?

The term "mechanically disjointed" means that the materials can be, in principle, separated by mechanical actions. This means that an insulated wire is considered as two homogeneous materials: the metal wire and the plastic insulating material.

8. Are there any exemptions to RoHS?

Yes. The list of exemptions is growing all the time. Exemptions may be found in RoHS and the RoHS Directive Annex.

9. My company is based in the US. Why should I worry about RoHS?

If you sell electrical or electronic equipment to any member state in the EU, or if you sell parts or

materials to companies that then sell their products on the EU market, your products are likely to be covered by RoHS. But even if your products aren't destined for the EU market, you still may have something to worry about. First, certain laws in California are already taking effect in the US. And countries such as China, Japan, and Canada are progressive with regards to reduction of hazardous materials.

Even though medical devices (which are a big Strategic Business Area at LINAK) are now exempt from RoHS, we may experience problems getting printed circuit boards with the well known tin-lead solder. Hence, "old" components may be harder to find, and/or more expensive to buy.

10. Does LINAK test all their products for every item on the material declarations?

No. If we did that, we would get a very big bill from a laboratory, which most certainly would be passed on to the customer. We rely on information on the concentration of RoHS and other declarable substances in the materials from your suppliers.

If the information is not available, we can act in two ways:

1. Test each homogeneous material.
2. Stop doing business with that client.

Obviously, this task is very time consuming. So, the more info, we can get from our suppliers, the earlier we can be compliant.

11. Which steps are LINAK going to take toward demonstrating RoHS-compliance of our products?

11a: Education. It is very important to understand, what it means to be RoHS-compliant and what products are affected by RoHS. A significant percentage of our production staff is participating educational programmes throughout 2005. Certain office workers and technicians will attend seminars during 2nd half of 2005.

11b: Awareness. The RoHS project group had to make sure, that upper management is aware of RoHS. That is, when it comes into effect, why the company's products are affected, and what the potential impact on the company might be. RoHS-compliance is a costly and time-consuming issue, so upper management had to be on board. RoHS-compliance at LINAK, means that we will have to go through big changes, including retooling, redesign, renumbering of part numbers, adjustment of purchasing practices, and editing of drawings and other internal company documentation such as material specifications.

11c: Assessment of our product line. Since early 2005 we had an external company validating our electronics-department. Wave soldering is not a big issue, and a switchover to RoHS-compliant production will come easy. Reflow soldering (SMD) is, however, a production capacity killer – due to significant changes in the process parameters in the ovens. As of July 2005, a project group has been set up, whose primary task is to buy new ovens and ensure minimum the same capacity.

11d: Survey of our materials and parts suppliers. We ask them if their products are RoHS-compliant and if they are, we ask them if they can supply either a statement to that effect or a certificate of analysis. If not, we ask them if and when they expect to be compliant or if they would be willing to get the necessary information together to support their product compliance. This requires them to do a survey of their suppliers and/or test their products. We may - on a case to case basis - want to test their products if the statements we receive are suspect.

11e: Fill in the gaps in our product compliance. That is, we might have to change suppliers to those who can demonstrate RoHS-compliance, or we may have to test our remaining items for compliance.

11f: Organize all the information we have gathered to back up statements of compliance for each product. This information will be kept available in case of customer request, or by an enforcement authority.

12. When will specific LINAK products be RoHS-compliant ?

This is hard to answer precisely, hence several issues add to the answer. Purchasing department is continuously examining every component in the inventory. As soon as a distributor or manufacturer of components confirms his compliance to RoHS, and LINAK is in the physical possession of the component, it will enter our Bill Of Material.

As soon as the specific Bill Of Material consists completely of RoHS compliant components, we may want to shift the production process also. However this cannot be done, unless other LINAK products, using the same production process, are 100 percent RoHS compliant as well.

The scenario will be somewhat like the following: Specific LINAK actuators may emerge as RoHS compliant on specific dates. There will be no (or small) correlation between the compliance dates for each actuator-series. This will to some extent apply to accessories as well. Specific LINAK control boxes, however, may all emerge as RoHS compliant within few months or less.

This paradoxical situation is unfortunately all driven by the logistic situation.

13. Does LINAK offer RoHS compliant prototypes?

Because of above, we can unfortunately **not** offer such prototypes, because we don't know the exact date on which each element of the product is compliant.

14. Why change the numbers on electronic components?

Unfortunately, old components are not compatible with the new production technique, mainly due to the upcoming higher soldering temperatures. But also due to significant risks of cracking in the solder-joints, when combining leadfree solder and lead-containing components. In order to keep track of, what is inserted where, and potential audit claims from BVQI and other organisations, it is crucial to know the day-by-day status of a BOM.

14. Why don't we change part numbers on any other component – apart from electronic components?

When the PCB-process is finished, and the board is assembled and working - the mixing of technologies is no longer worrying with regards to quality. So we didn't want to lay on the extra work of changing part no's, onto any other component. Still we must have the compliance-date in mind, where any component within an electrical appliance must comply.